DRIVE-SECTION-ISOLATED FOUP OPENER

## BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to a container opener for opening/closing a sealable container for containing and transferring a plurality of semiconductor wafers oriented horizontally and arranged in layers at predetermined intervals. More particularly, the invention relates to a front opening unified pod (FOUP) opener having a structure such that a drive section for a port door including a detachment/attachment mechanism for detaching/attaching a FOUP door and a holder mechanism for holding the FOUP door, and a drive section for a sensor mechanism for detecting presence/absence, storage condition, and position of wafers contained in the FOUP are arranged in an improved manner.

Description of the Related Art:

A FOUP opener is adapted to establish communication between a space (a first control space) within a FOUP and a wafer transfer space (a second control space) and to enable transfer of wafers from the first control space to the second control space without exposure to the ambient atmosphere, by means of, for example, a robot. When the wafers are highly-precise wafers having a diameter of 300 mm or more, since such wafers are very expensive, the FOUP opener must satisfy strict requirement against wafer contamination with dust; specifically, dust particles generated by the FOUP opener

itself must be reduced to one particle/10 cft or less (0.1 μm particles), and a mapping report error rate must be decreased to once/0.1-1 million wafers or lower. In order to detect presence/absence, storage condition, or position of wafers contained in the FOUP before transfer of the wafers, mapping means is provided on either the FOUP opener or a robot. Generally, provision of the mapping means is optional for the FOUP opener and the robot.

FIG. 5 shows a conventional FOUP opener. As shown in FIG. 5, operation of a FOUP opener 01 for detaching a FOUP door 013 from and attaching the FOUP door 013 to an opening portion of a FOUP 010 and for moving the FOUP door 013 vertically is performed within a second control space 200 that maintains a clean room atmosphere. Accordingly, a drive section of a horizontal-movement mechanism 040 for moving a port door 023 and a sensor 070 horizontally and a drive section of a vertical-movement mechanism 050 for moving the port door 023 and the sensor 070 vertically are disposed within the second control space 200; and the port door 023 includes a detachment/attachment mechanism for detaching/attaching the FOUP door 013 and a holder mechanism for holding the FOUP door 013 (see Japanese Patent Application Laid-Open (*kokai*) No. 11-145244). Reference numeral 014 denotes a semiconductor wafer, reference numeral 021 denotes a port plate, and reference numeral 300 denotes an ambient atmosphere.

Thus, there has been a problem such that the drive

sections, which are dust generation sources, contaminate the second control space 200, which must maintain a clean atmosphere. For example, when a movable member is actuated by a motor or cylinder of a drive section, friction causes generation of dust, which is scattered within a clean room (the second control space 200). Also, an organic substance generated through vaporization of a smoother or lubricant applied to a movable member is scattered within the clean room 200. As a result, the clean room 200 fails to maintain a high level of cleanliness. Furthermore, when the drive sections are to be subjected to service work, such as maintenance, inspection, or repairs, within the clean room 200, a worker must move or remove equipment in order to establish work space within the clean room 200, resulting in scattering of dust within the clean room 200. Thus, restoration of cleanliness within the clean room 200 to a regular, high level consumes a considerably great amount of time and involves incurrence of cost. In order to enable a worker to work within the clean room 200, equipment for removing dust from the worker must be installed, thus again involving incurrence of cost.

In order to cope with the above problem, a FOUP opener as shown in FIG. 6 has been proposed (see Japanese *kohyo* (PCT) Patent Published (re-published) No. WO99/28965). As shown in FIG. 6, a port door is disposed outside a clean room (a second control space 200) so as to carry out opening/closing and vertical movement of a FOUP door outside

the clean room 200. However, since a port door 023 is located between a FOUP 010 and a port plate 021, a gap g is formed therebetween. The gap g involves possible entry of dust into the FOUP 010 (first control space 100) and the clean room 200 from outside the clean room 200 (from an ambient atmosphere 300), possible adhesion of the dust to the inside surface of a FOUP door 013 and the outside surface of the port door 023, and possible outflow of a large amount of highly clean air to the exterior of the clean room 200.

In the case of the FOUP opener 01 of the patent publication, the distance between the FOUP 010 and the port plate 021 becomes long (the gap g becomes large). Thus, when the positioning accuracy of the FOUP 010 deteriorates due to machining errors, assembly errors, and wear of a dock plate 031 for carrying and positioning the FOUP 010 and components of a dock moving mechanism 030 for moving the dock plate 031 to the position of detachment/attachment of the FOUP door 013, presence/absence, storage condition, and position of wafers 014 contained in the FOUP 010 cannot be detected at high accuracy, thus causing a possible problem in transfer of the wafers 014.

## SUMMARY OF THE INVENTION

An object of the present invention is to solve the above-mentioned problems in the conventional FOUP openers and to provide a FOUP opener which does not involve contamination of a clean room (a second control space) with contaminants

generated by drive sections of horizontal- and vertical-movement mechanisms for a port door and a sensor; which does not involve entry of dust into a FOUP (first control space) and the clean room from outside the clean room (an ambient atmosphere), and adhesion of the dust to the inside surface of a FOUP door and the outside surface of the port door; which does not involve outflow of a large amount of highly clean air to the exterior of the clean room; and which does not involve a long distance between the FOUP and a port plate, to thereby avoid impairment in accuracy in positioning of the FOUP due to machining errors, assembly errors, and wear of a dock plate and components of a dock moving mechanism, so that a mapping sensor can maintain high detection accuracy to thereby avoid a possible problem in transfer of wafers.

To achieve the above object, the present invention provides a drive-section-isolated FOUP opener for opening and closing a FOUP door which closes a front opening portion of a FOUP containing a plurality of semiconductor wafers oriented horizontally and arranged in layers at predetermined intervals. The FOUP opener comprises a dock plate for carrying and positioning the FOUP; a dock moving mechanism for moving the dock plate to a position for detachment and attachment of the FOUP door; a port door including a detachment/attachment mechanism for detaching and attaching the FOUP door and a holder mechanism for holding the FOUP door; a port plate including an opening portion, the opening portion being closed by the port door; a port door

horizontal-movement mechanism for horizontally moving the port door; a sensor horizontal-movement mechanism for horizontally moving a sensor bracket, the sensor bracket having a mapping sensor mounted on an upper portion thereof and adapted to detect presence/absence, storage condition, and position of wafers contained in the FOUP; and a port-door-and-sensor vertical-movement mechanism for vertically moving the port door and the sensor bracket with the port door holding the FOUP door, so as to house the FOUP door. A drive section of the port door horizontal-movement mechanism, a drive section of the sensor horizontal-movement mechanism, and a drive section of the port-door-and-sensor vertical-movement mechanism are disposed in opposition to a clean room with respect to the port plate, the clean room housing the port door and the sensor bracket.

Thus, in the drive-section-isolated FOUP opener of the present invention, the drive section of the port door horizontal-movement mechanism, the drive section of the sensor horizontal-movement mechanism, and the drive section of the port-door-and-sensor vertical-movement mechanism are disposed in opposition to the clean room (the second control space)—which houses the port door and the sensor bracket—with respect to the port plate to thereby be isolated from the clean room.

As a result, the port plate prevents entry into the clean room of dust generated from the drive sections. For example, when a movable member actuated by a motor or

cylinder of a drive section generates dust through friction, the dust is not scattered into the clean room. Also, an organic substance generated through vaporization of a smoother or lubricant applied to a movable member is not scattered into the clean room. Furthermore, when the drive sections are to be subjected to service work, such as maintenance, inspection, or repairs, a worker does not need to enter the clean room; i.e., the worker does not need to move or remove equipment in order to establish work space within the clean room, thereby avoiding contamination of the clean room with dust associated with such work. Therefore, the clean room can maintain a high level of cleanliness.

Since a worker does not need to enter the clean room when the drive sections are to be subjected to service work, such as maintenance, inspection, or repairs, there is no need to install equipment for removing dust from the worker who is to enter the clean room for performing service work, thereby lowering equipment expenses.

Since the port door is disposed within the clean room, the distance between the FOUP and the port plate can be rendered zero or short; thus, the gap therebetween becomes very small, thereby avoiding entry of dust into the FOUP (first control space) and the clean room from outside the clean room (an ambient atmosphere), and adhesion of the dust to the inside surface of the FOUP door and the outside surface of the port door as well as outflow of a large amount of highly clean air to the exterior of the clean room. Thus,

the clean room can maintain a high level of cleanliness in a more reliable condition.

Furthermore, since the gap between the FOUP and the port plate becomes very small, impairment in accuracy in positioning of the FOUP due to machining errors, assembly errors, and wear of the dock plate and components of the dock moving mechanism can be avoided. Thus, the mapping sensor can maintain high detection accuracy, so that wafers can be transferred at high reliability.

Preferably, the port plate has a guide slit located underneath the opening portion in a downwardly extending condition, and the drive section of the port door horizontal-movement mechanism, the drive section of the sensor horizontal-movement mechanism, and the drive section of the port-door-and-sensor vertical-movement mechanism move the port door and the sensor bracket horizontally or vertically, via the guide slit.

Thus, entry of dust into the clean room through the guide slit from outside the clean room and outflow of a large amount of highly clean air to the exterior of the clean room through the guide slit can be suppressed to the greatest possible extent, thereby contributing to the maintenance of a high level of cleanliness in the clean room. Arms of the port door and sensor bracket move along the guide slit, thereby involving possible generation of dust. However, the dust can be ejected to the exterior of the clean room from the guide slit through employment of a clean room pressure (a

positive clean room pressure) higher than a pressure outside the clean room. Thus, this feature also contributes to the maintenance of a high level of cleanliness in the clean room.

Preferably, the guide slit is used in common for moving the port door and the sensor bracket.

Thus, the number of guide slits can be minimized to thereby enhance the aforementioned effects.

Preferably, the drive-section-isolated FOUP opener of the present invention further comprises a drive section chamber for housing the drive section of the port door horizontal-movement mechanism, the drive section of the sensor horizontal-movement mechanism, and the drive section of the port-door-and-sensor vertical-movement mechanism. The drive section chamber includes a device for exhausting an atmosphere in the drive section chamber to the exterior of the drive section chamber.

Thus, entry of dust generated in the drive sections into the clean room through the guide slit can be completely prevented, thereby maintaining the clean room at a high level of cleanliness in a more reliable condition.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic sectional view of a drive-section-isolated FOUP opener according to an embodiment of the present invention showing the FOUP opener in a state before a FOUP door is opened;

FIG. 2 is a schematic back view of the FOUP opener of

FIG. 1 as viewed with a drive section chamber wall removed;

FIG. 3 is a sectional view taken along line III-III of FIG. 2;

FIG. 4 is a schematic partial perspective view of the FOUP opener of FIG. 1 as viewed from the port door side;

FIG. 5 is a view of a conventional FOUP opener; and

FIG. 6 is a view of another conventional FOUP opener.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the present invention will next be described in detail with reference to the drawings.

As shown in FIG. 1, a drive-section-isolated FOUP opener 1 of the present embodiment includes a FOUP 10 containing a plurality of semiconductor wafers 14 oriented horizontally and arranged in layers at predetermined intervals; a dock plate 31 for carrying and positioning the FOUP 10; a dock moving mechanism 30 for moving the dock plate 31 to a position of detachment/attachment of a FOUP door 13; a port door 23 including a detachment/attachment mechanism (not shown) for detaching/attaching the FOUP door 13 and a holder mechanism (not shown) for holding the FOUP door 13; a port plate 21 including an opening portion 22, the opening portion 22 being closed by the port door 23; a port door horizontal-movement mechanism 40 for horizontally moving the port door 23; a sensor horizontal-movement mechanism 60 for horizontally moving a sensor bracket 62, the sensor bracket 62 having a mapping sensor 70 mounted on an upper portion

thereof, the mapping sensor 70 being operative to detect presence/absence, storage condition, and position of the wafers 14 contained in the FOUP 10; and a port-door-and-sensor vertical-movement mechanism 50 for vertically moving the port door 23 and the sensor bracket 62 with the port door 23 holding the FOUP door 13, so as to house the FOUP door 13 in a front end (a second control space 200).

The FOUP 10 assumes the form of a sealed container when a front opening portion 12 of a FOUP frame 11 serving as a body of the FOUP 10 is closed by the FOUP door 13. The port plate 21 and the port door 23 partially constitute an interface wall of the front end configured to interface with the FOUP 10 and are adapted to isolate the second control space 200, which is configured as a clean room and serves as a wafer transfer space, from an ambient atmosphere 300. As shown in FIG. 4, the sensor bracket 62 assumes the form of a rectangular frame and is arranged in such a manner as to surround the port door 23 and a lower extension member 42 extending downward from the port door 23 with a slight gap formed therebetween.

The port door horizontal-movement mechanism 40 is configured in the following manner. An arm member 44 is perpendicularly attached to a lower end portion of the lower extension member 42 extending downward from the port door 23. The arm member 44 is disposed on the upper surface of a vertical-movement platform 51 of the port-door-and-sensor vertical-movement mechanism 50, which will be described later,

in a condition slidable along a linear guide 41. An end portion of the arm member 44 is connected to an output shaft of a port door horizontal-movement mechanism drive motor 43, which is operative to move the arm member 44 horizontally (in the right-and-left direction in FIG. 1). The arm member 44 extends through a guide slit 52 formed in the port plate 21 in such a manner as to extend downward from underneath an opening portion 22 of the port plate 21. The arm member 44 moves horizontally and vertically along the guide slit 52.

The sensor horizontal-movement mechanism 60 is configured in the following manner. An arm member 64 is perpendicularly attached to a lower end portion of the sensor bracket 62 and disposed on the lower surface of the vertical-movement platform 51 of the port-door-and-sensor vertical-movement mechanism 50, which will be described later, in a condition slidable along a linear guide 61. An end portion of the arm member 64 is connected to an output shaft of a sensor horizontal-movement mechanism drive motor 63, which is operative to move the arm member 64 horizontally. As in the case of the arm member 44, the arm member 64 extends through the guide slit 52 while being located underneath the arm member 44, and moves horizontally and vertically along the guide slit 52.

As shown in FIG. 2, the right-hand and left-hand vertical-movement platforms 51, arm members 44, and arm members 64 are located while being biased toward the right-hand and left-hand side edges of the port plate 21. The

right-hand and left-hand vertical-movement platforms 51 are connected unitarily by means of a connection member 55 extending in the right-and-left direction in FIG. 2. The connection member 55 has a nut accommodating portion 56 formed at a central portion along the right-and-left direction. The nut accommodating portion 56 houses a ball nut engaged with a screw shaft 54. As the screw shaft 54 is rotated by a servomotor 53, the nut accommodating portion 56 which houses the ball nut engaged with the screw shaft 54 is caused to move vertically; i.e., the connection member 55 whose integral portion is the nut accommodating portion 56 moves vertically. The vertical movement of the connection member 55 causes the port door 23 and the sensor bracket 62 to move vertically as a unit via the paired vertical-movement platforms 51, arm members 44, and arm members 64.

As shown in FIGS. 2 and 3, the connection member 55 moves vertically along the outside surface of the port plate 21 while being guided by the following guide mechanism. Guide grooves 58 are formed in the corresponding right-hand and left-hand vertical-movement platforms 51—which are connected unitarily by means of the connection member 55—and fitted to corresponding guide rails 57, which are fixedly provided on the outside surface of the port plate 21 while being biased toward the right-hand and left-hand side edges of the port plate 21 and extending vertically.

The port door horizontal-movement mechanism drive motor 43 is fixedly provided on the upper surface of the right-hand

vertical-movement platform 51 of FIG. 2, whereas the sensor horizontal-movement mechanism drive motor 63 is fixedly provided on the lower surface of the left-hand vertical-movement platform 51 of FIG. 2. Thus, through installation of the port door horizontal-movement drive motor 43 and the sensor horizontal-movement drive motor 63 in opposition to each other in the right-and-left direction of FIG. 2, weight balance is established in the right-and-left direction for a unitary assembly composed of the connection member 55, paired right- and left-hand vertical-movement platforms 51, and the motors 43 and 63. However, the motors 43 and 63 may be fixedly provided on the upper and lower surfaces, respectively, of the right-hand or left-hand vertical-movement platform 51.

The servomotor 53, the screw shaft 54, the connection member 55 including the nut accommodating portion 56, and the paired vertical-movement platforms 51 constitute the port-door-and-sensor vertical-movement mechanism 50. As shown in FIGS. 1 and 2, the port-door-and-sensor vertical-movement mechanism 50 is disposed in opposition to the clean room (the second control space 200)—which houses the port door 23 and the sensor bracket 62—with respect to the port plate 21 while being housed in a drive section chamber 80.

Since the port-door horizontal-movement mechanism drive motor 43 and the sensor horizontal-movement mechanism drive motor 63 are fixedly provided on the right- and left-hand vertical-movement platforms 51, respectively, the motors 43

and 63 are also housed in the drive section chamber 80. Also, the drive section chamber 80 houses portions of the arm members 44 of the port door horizontal-movement mechanism 40 which slide along the linear guide 41 and portions of the arm members 64 of the sensor horizontal-movement mechanism 60 which slide along the linear guide 61.

Accordingly, the drive section (which is composed of the port door horizontal-movement mechanism drive motor 43 and the linear guide 41) of the port door horizontal-movement mechanism 40, the drive section (which is composed of the sensor horizontal-movement mechanism drive motor 63 and the linear guide 61) of the sensor horizontal-movement mechanism 60, and the drive section (which is composed of the servomotor 53, the screw shaft 54, the connection member 55 including the nut accommodating portion 56, and the paired right- and left-hand vertical-movement platforms 51) of the port-door-and-sensor vertical-movement mechanism 50 are disposed in opposition to the clean room 200—which houses the port door 23 and the sensor bracket 62—with respect to the port plate 21 to thereby be isolated from the clean room 200 while being housed in the drive section chamber 80.

The drive section chamber 80 is equipped with a fan 81 for exhausting an atmosphere in the drive section chamber 80 to the exterior of the drive section chamber 80. The fan 81 is operative to exhaust dust generated from the drive section of the port door horizontal-movement mechanism 40, the drive section of the sensor horizontal-movement mechanism 60, and

the drive section of the port-door-and-sensor vertical-movement mechanism 50, to the ambient atmosphere 300, thereby preventing contamination of the clean room 200 with the dust. Preferably, the fan 81 is installed on a wall of the drive section chamber 80 at the lowest possible position.

Next, the operation of the drive-section-isolated FOUP opener 1 of the present embodiment will be described in detail.

In FIG. 1, the FOUP door 13 is about to be detached from the FOUP frame 11, and the port door 23 and the mapping sensor 70 are on standby. First, when the port door 23 vacuum-chucks and holds the FOUP door 13, the port door horizontal-movement mechanism 40 operates so as to retreat the port door 23 horizontally, which is not illustrated in detail. Then, the port-door-and-sensor vertical-movement mechanism 50 operates so as to lower the sensor bracket 62, together with the port door 23, to a position where the mapping sensor 70 is to be caused to enter the FOUP 10, thereby positioning the mapping sensor 70.

Next, the sensor horizontal-movement mechanism 60 operates so as to cause the mapping sensor 70 to enter the FOUP 10 independently of the port door 23. Subsequently, the port-door-and-sensor vertical-movement mechanism 50 operates so as to lower the mapping sensor 70, together with the port door 23, to the bottom wafer position. During the lowering movement, the mapping sensor 70 detects presence/absence, condition (inclined insertion, multiple insertion and other

items), and position (height) of the wafers 14 contained in the FOUP 10. The results of detection are transmitted to an unillustrated wafer transfer robot one after another.

When the mapping sensor 70 lowers to the bottom wafer position, the sensor horizontal-movement mechanism 60 operates so as to retreat the mapping sensor 70 from inside the FOUP 10 independently of the port door 23. Finally, the port-door-and-sensor vertical-movement mechanism 50 operates so as to lower and retreat the port door 23 and the mapping sensor 70 in unison, thereby housing the FOUP door 13 in the front end (the second control space 200).

The present embodiment is configured and functions as described above, thereby yielding the following effects.

In the drive-section-isolated FOUP opener 1, the drive section of the port door horizontal-movement mechanism 40, the drive section of the sensor horizontal-movement mechanism 60, and the drive section of the port-door-and-sensor vertical-movement mechanism 50 are disposed in opposition to the clean room (the second control space 200)—which houses the port door 23 and the sensor bracket 62—with respect to the port plate 21 to thereby be isolated from the clean room 200. Thus, the port plate 21 prevents entry into the clean room 200 of dust generated from the drive sections. For example, when a movable member actuated by a motor (the port door horizontal-movement mechanism drive motor 43, the sensor horizontal-movement mechanism drive motor 63, or the port door-and-sensor vertical-movement drive servomotor 53) of a

drive section generates dust through friction, the dust is not scattered into the clean room 200. Also, an organic substance generated through vaporization of a smoother or lubricant applied to a movable member is not scattered into the clean room 200. Furthermore, when the drive sections are to be subjected to service work, such as maintenance, inspection, or repairs, a worker does not need to enter the clean room 200; i.e., the worker does not need to move or remove equipment in order to establish work space within the clean room 200, thereby avoiding contamination of the clean room 200 with dust associated with such work. Therefore, the clean room 200 can maintain a high level of cleanliness.

Also, since the port door 23 is disposed within the clean room 200, the distance between the FOUP 10 and the port plate 21 can be rendered zero or short; thus, the gap therebetween becomes very small, thereby avoiding entry of dust into the FOUP 10 (the first control space 100) and the clean room 200 from outside the clean room 200 (the ambient atmosphere 300), and adhesion of the dust to the inside surface of the FOUP door 13 and the outside surface of the port door 23 as well as outflow of a large amount of highly clean air to the exterior of the clean room 200. Thus, the clean room 200 can maintain a high level of cleanliness in a more reliable condition.

Furthermore, the port plate 21 has the guide slit 52 located underneath the opening portion 22 in a downwardly extending condition, and the drive section of the port door

horizontal-movement mechanism 40, the drive section of the sensor horizontal-movement mechanism 60, and the drive section of the port-door-and-sensor vertical-movement mechanism 50 move the port door 23 and the sensor bracket 62 horizontally or vertically, via the guide slit 52. Thus, entry of dust into the clean room 200 through the guide slit 52 from outside the clean room 200 and outflow of a large amount of highly clean air to the exterior of the clean room 200 through the guide slit 52 can be suppressed to the greatest possible extent, thereby contributing to the maintenance of a high level of cleanliness in the clean room 200.

The arms 44 and 64 respectively connected to the port door 23 and sensor bracket 62 move along the guide slit 52 horizontally and vertically, thereby involving possible generation of dust. However, the dust can be ejected to the exterior of the clean room 200 from the guide slit 52 through employment of a clean room pressure (a positive clean room pressure) higher than a pressure outside the clean room 200. Thus, this feature also contributes to the maintenance of a high level of cleanliness in the clean room 200.

Furthermore, since the right- and left-hand guide slits 52 are provided and used in common for moving the port door 23 and the sensor bracket 62, the number of guide slits 52 can be minimized to thereby enhance the aforementioned effects. Also, the drive section chamber 80 includes the fan 81 for exhausting an atmosphere in the drive section chamber

80 to the exterior of the drive section chamber 80. Thus, entry of dust generated in the drive sections into the clean room 200 through the guide slits 52 can be completely prevented, thereby maintaining the clean room 200 at a high level of cleanliness in a far more reliable condition.

Also, since the gap between the FOUP 10 and the port plate 21 becomes very small, impairment in accuracy in positioning of the FOUP 10 due to machining errors, assembly errors, and wear of the dock plate 31 and components of the dock moving mechanism 30 can be avoided. Thus, the mapping sensor 70 can maintain high detection accuracy, so that the wafers 14 can be transferred at high reliability.

Furthermore, since a worker does not need to enter the clean room 200 when the drive sections are to be subjected to service work, such as maintenance, inspection, or repairs, there is no need to install equipment for removing dust from the worker who is to enter the clean room 200 for performing service work, thereby lowering equipment expenses.

The present invention is not limited to the above-described embodiment, but may be modified as appropriate without departing from the spirit or scope of the invention.

For example, the connection member 55 and the paired right- and left-hand vertical-movement platforms 51 may be connected in such a manner that the right- and left-hand vertical-movement platforms 51 are disposed on the upper or lower surface of the connection member 55 at right- and left-hand end portions thereof, while the guide groove 58 is

formed in each of right- and left-hand end portions of the connection member 55 and the right- and left-hand vertical-movement platforms 51. In this case, the vertical movement of the port-door-and-sensor vertical-movement mechanism 50 can be guided in a more reliable manner. Also, the individual drive sections may employ a power cylinder in place of the motor 43, 53, or 63, as an actuator.